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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN RE APPLICATION OF:

Gerhard Andreas KRAUSE, et al.

SERIAL NO.: 10/529,901

FILED: April 1, 2005

FOR: METHOD FOR IMPROVING THE DURABILITY, DIMENSIONAL STABILITY AND
SURFACE HARDNESS OF A WOODEN BODY

DECLARATION UNDER 37 C.F.R. §1.132

COMMISSIONER FOR PATENTS
WASHINGTON, D.C. 20231

SIR:

Now comes Dr. Arend Jouke Kingma who deposes and states:

1. I graduated in chemistry at the University of Hamburg, Germany, and received my diploma degree in the year 1986 and my doctorate degree in the year 1990 by the University of Geneva, Switzerland.

2. I have been employed by BASF Aktiengesellschaft since 1990. From 1997 to 2000, I worked in the field of polyalkoxylates as a research manager and from 2000 to 2004 in the field of watersoluble polymers as a product manager. Since 2005, I have been working in the field of development of technologies for bulking wood. Therefore, I am fully conversant with the technical field to which the invention disclosed and claimed in application Serial No. 10/529,901 belongs.

3. I have read and fully understood U.S. application, Ser. No. 10/529,901.

4. I have studied the record of application Serial No. 10/529,901, in particular the Office Action of August 13, 2007, and the prior art applied by the Examiner, in particular the teaching of Gardiner (US 4,005,039).

5. It is my understanding that the Examiner contends that the particular features of the process according to the claims of application Serial No. 10/529,901, are already known from Gardiner.

I cannot share the Examiner's position as set forth in the Office Action of August 13, 2007, for the following reasons.

The teaching of Gardiner relates to a method for bulking timber comprising impregnating timber with a bulking composition containing

- i. a modified polyol in which at least two of the free hydroxyl groups have been converted into alkyleneamido ether groups, e.g. by reacting the polyol with acrylonitrile;
- ii. an amino resin precursor containing N-hydroxymethyl groups such as 4,5-dihydroxy-1,3-dihydroxymethylimidazolidin-2-one (hereinafter DMDHEU);
- iii. a curing catalyst for catalyzing the curing of the composition when heated; and
- iv. a polar solvent capable of swelling wood, e.g. water;

drying the treated timber and curing the bulking composition at a temperature from about 60°C to about 120°C.

The process of Gardiner comprises a drying step and a curing step. Drying is performed in an oven or kiln at 50 to 80°C for about 12 to 24 h. During this period most of the water contained in the bulking composition is removed. Then the wooden body is cured at elevated temperatures (see column 6, lines 35 to 45). The drying and the curing can be combined in one operation by gradually heating the impregnated wood piece over a 10 to 24 h period to the curing temperature and then maintaining the temperature (see column 6, lines 46 to 51). This means that the wood is dried below the fiber saturation point before curing starts. Even if the wood piece had been heated directly to the curing temperature, the impregnated wood body would have been dried below the fiber saturation point during curing.

In contrast thereto, the process according to claim 1 of U.S. application, Ser. No. 10/529,901 requires maintaining humid conditions during the hardening or curing at elevated temperature. Maintaining humid conditions serves for avoid drying of the wood below the fiber saturation point during hardening or curing, as explained on page 5 of U.S. application, Ser. No. 10/529,901. Gardiner does not teach to maintain humid conditions during the hardening nor does Gardiner teach to avoid drying of the wood below the fiber saturation point during

hardening. Rather, the teaching of Gardiner leads to drying the woodpiece below the fiber saturation point during curing.

Maintaining humid conditions during the hardening, however, is important to avoid formation of cracks or splintering of the wood. This is demonstrated by the following comparative test.

1. Example according to U.S. application, Ser. No. 10/529,901.

Boards of beech wood having the dimensions 30 mm x 140 mm x 500 mm were impregnated with a 30 % aqueous solution of modified DMDHEU (reaction product of DMDHEU with a mixture of methanol and diethylene glycol) as described for use example 1 of U.S. application, Ser. No. 10/529,901.

The wood boards were then stored in a drying chamber controllable via temperature and atmospheric humidity and fixed so that warping was impossible. The chamber was brought to 95°C and a relative humidity of about 95%. These humid conditions were maintained until a temperature of at least 90°C was reached for 48 hours in the interior of the wood boards. During this time the curing of the modified DMDHEU occurs.

Subsequently, the wood boards were heated to 130°C, which reduced the relative air humidity to less than 10%. These conditions were maintained until a uniform wood moisture content of approximately 4% over the entire cross section of the wood was obtained. Subsequently, the chamber temperature was lowered to 80°C by blowing in fresh air. The chamber temperature was then reduced to 50°C and the relative air humidity was adjusted to 50% by spraying with water. These conditions were maintained for 6 to 10h in order to condition the wood. The thus obtained wood boards did not show cracks as shown in figures 1 and 2.

Figure 1:



Figure 2:



2. Comparative example according to prior art

Boards of beech wood having the dimensions 30 mm x 140 mm x 500 mm were impregnated with a 30 % aqueous solution of modified DMDHEU (reaction product of DMDHEU with a mixture of methanol and diethylene glycol) as described for use example 1 of U.S. application, Ser. No. 10/529,901.

The wood boards were then stored in a drying chamber controllable via temperature and atmospheric humidity and fixed so that warping was impossible. The chamber was heated to 110°C and the conditions were maintained until a temperature of at least 100°C was reached for 48 hours in the interior of the wood boards. During this time the relative air humidity decreases to less than 10%. Subsequently, the chamber temperature was lowered to 80°C by blowing in fresh air. The chamber temperature was then reduced to 50°C and the relative air

humidity was adjusted to 50% by spraying with water. These conditions were maintained for 6 to 10 h in order to condition the wood.

The thus obtained wood boards showed severe cracks as shown in figures 3 and 4.

Figure 3:

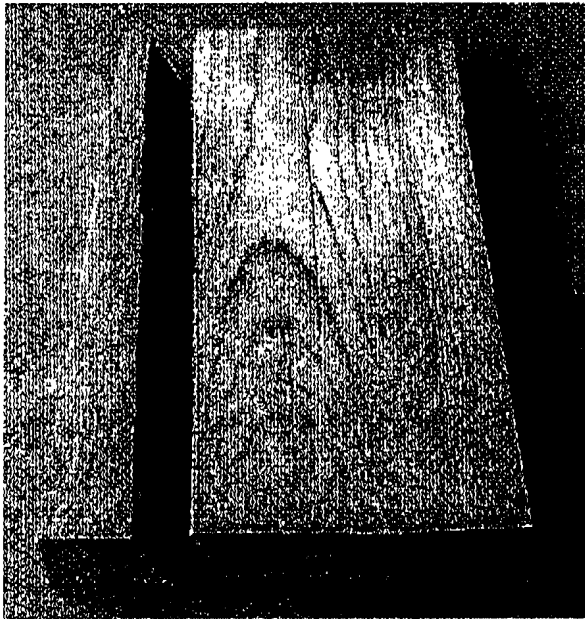
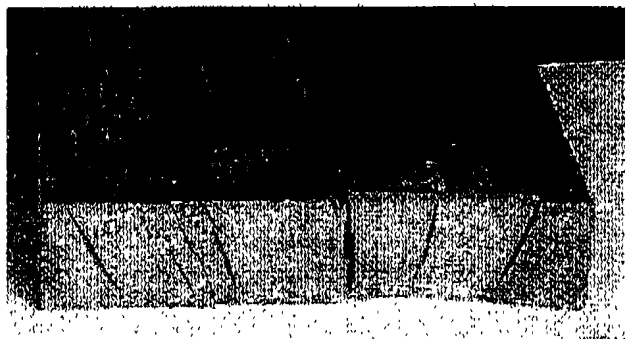


Figure 4:



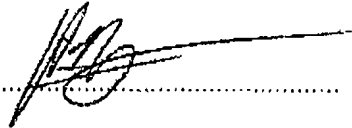
It is apparent from the foregoing, that the process taught by Gardiner leads to a severe damage of the wood boards and thereby increases the wastage. Surprisingly, the formation of cracks or splintering of the impregnated wood can be decreased by applying humid conditions during curing. Most surprisingly, the thus obtained cured wood can be heated to temperatures as high as 130°C without formation of cracks as shown in the example according to U.S.

application, Ser. No. 10/529,901. This post curing allows for a better fixation of the cured amino resin in the wood body.

6. The undersigned petitioner declares further that all statements made herein of his own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of this application or any patent issuing thereon.

7. Further deponent saith not.

Ludwigshafen January 11th, 2008


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(Arend Jouke Kingma)